DOCUMENT RESUME

ED 150 868 FL 009 268

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TITLE Language Acquisition Patterns in Two Normal Children of Deaf Parents.
PUB DATE 77
NOTE 16p.; Paper presented at the annual Boston University Conference on Language Development (2nd, Boston, Massachusetts, Sept. 30-Oct. 1, 1977)

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS Case Studies; Child Development; *Child Language; Deaf Research; *Language Development; Language Handicapped; Language Patterns; Language Research; *Parent Child Relationship; Parent Influence; Psycholinguistics; Sign Language; Speech Skills; *Syntax; Verbal Development
IDENTIFIERS *Deaf Parents

ABSTRACT

This paper describes the linguistic development of two hearing sons of deaf parents. Both were exposed to an early language environment different from that of the average hearing child. At the start of the study, the boys were aged 3 years, 9 months, and 1 year, 8 months, respectively. When first observed, the older child performed well below age level in all aspects of language on standardized tests. In addition, he exhibited complete lack of affect in his speech and an idiosyncratic syntactic structure. Within a month of conversational sessions with an adult, there was marked improvement in this child's expressive abilities. At age 4 years, 2 months, most of the idiosyncratic patterns had been replaced by structures typical for that age. At 10 years, he is signing well, although at the start of the study he did not sign at all. The younger boy used no speech at the beginning of the investigation, but had his brother as a linguistic model, and at no time did he demonstrate the deviant structures used by the older boy. At 3 years, 8 months, the age at which the older boy had been first examined, the younger boy was functioning normally in terms of both expressive and receptive skills. Implications of these case studies include: (1) an environment that is much less than optimum may be sufficient for a child to acquire syntactic patterns; (2) in the absence of tailored input, children invent ways of expressing what they want to say; and (3) quantity of input is not the only factor in language acquisition - quality of input, in this case personal vs. impersonal input, is perhaps the most significant. (AM)

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LANGUAGE ACQUISITION PATTERNS IN TWO NORMAL CHILDREN OF DEAF PARENTS[1]

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Paper presented at the Second Annual Boston University Conference on Language Development, 1977.

A009268

In recent years, many studies have shown that adults interact with children learning language in a linguistic style that is different in various ways from adult-adult speech. Utterances are spoken more slowly and clearly (Broen, 1972; Drach, 1969; Sachs, Brown and Salerno, 1976); they tend to be shorter and have less syntactic depth; (Phillips, 1973; Snow, 1972); topics of discourse are closely related to the non-linguistic context (Bloom, 1970; Brown and Bellugi, 1964; Sachs, 1977); and repetitions, paraphrases and expansions are used to clarify meanings (Brown and Bellugi, 1964; Snow, 1972). Some of these characteristics of the speech addressed to children could conceivably help the child in his discovery of the relationship between sound and meaning in his language. However, it is difficult to draw conclusions about the importance of modifications of the input for language development from a study of normal cases alone.

In this paper, we report on two children whose early language environment was different from that of the average child. These were two normally hearing brothers whose parents were deaf. At the time our study began the children were 3, 9, and 1, 8. They had been cared for almost exclusively by their mother, who could lip-read but had limited oral language. She used only occasional single-word utterances to the children. They had had little contact with hearing adults, but watched television frequently. Thus, these children were exposed to some English, but they had received very little input that was directed to them individually.

In most families where one or both parents are deaf, the children learn sign language (Lenneberg, 1967; Schiff & Ventry, 1976; Todd, 1975). The family we studied was unusual in this respect, because the mother did not use sign to her children. She knew that they could hear and believed that signing was inappropriate for them.

The children's exposure to sign consisted of seeing adults sign to one another. Again, the linguistic input was not directed to them individually. Neither child began his linguistic development in an environment in which a caregiving adult communicated with him in a conventional linguistic medium, either oral or manual. We will describe some aspects of the development of each child and then discuss the implications of these for an understanding of the role of linguistic input in language acquisition.

The older child, who we will call Jim, had been referred to the University of Connecticut Speech Clinic when he was three years, nine months. In the first month, Jim was seen seven times in a conversational situation, with no attempt to provide structured language stimulation. Jim was given standardized tests of language and motor abilities at the first session and the last. Some of the data from the first month have also been reported in an earlier paper by Sachs and Johnson (1976). When Jim was 4, five more language samples were collected at monthly intervals. Jim was occasionally observed and tested over several years. He is now 10 years old.

Interviews carried out in writing with the mother revealed that she had tried to get Jim to say some words, but he wouldn't imitate her. She did not observe any attempts at speech until about 2 years, 6 months. At that time he started to say some words that he learned from TV. She thought most of the words were from commercials and gave "Kool-aid" as an example. When Jim was first observed, he had been attending a preschool program for handicapped children for about a month. The teacher reported that she had not spent much time with Jim individually. She considered him a very quiet child who caused no problems in the group.

Jim's performance on standardized tests at 3 years, 9 months showed that he was very much below age level in all aspects of language. However,

such a comparison with the norms for average children does not really reveal the character of Jim's speech. One striking characteristic initially was a complete flatness or lack of affect in his speech. Jim spoke very softly, in a monotone. Furthermore, his language was quite idiosyncratic in terms of its structure. Jim attempted to express ideas that seemed appropriate for his age, but lacked the syntactic knowledge that would normally accompany such communicative intentions. In one instance, the investigator asked "Do you like to play ball?" Jim replied:

(1) My mommy my house ə play ball.

This utterance seemed to mean that he played ball at home with his mother. Other similar utterances are listed in examples 2 - 8:

(2) My mommy in the house apple.

(3) House chimney. My house my chimney.

(4) Fall that back.

(5) Be down go.

(6) There crash it.

(7) That car it go truck.

(8) Go downstairs snack.

Though Jim was not using the English syntactic patterns that would be expected at his age, his language had its own regularities. For example, one of Jim's strategies for forming utterances was to use a phrase and then a further specification of the topic, often resulting in word orders opposite of those used in English:

(9) Off my mittens.

(10) Not broke that.

(11) This not take off plane.

(12) Right there wheels.

(13) Going house ə fire truck.

(14) Where is it plane.

In another case, Jim was looking at a picture of two houses, and said:

(15) House. Two house. Not one house. That two house.

Two did not always refer to two objects, but signalled plurality, as when he said of picture of a box of crayons:

(16) Two crayon. Big two crayon.

Similar examples are given in 17 and 18 :

(17) Not window. Two window.

(18) That enough two wing.

Although Jim did not have the conventional inflectional marking for plural in his language system, he was clearly aware of plurality and seeking a way to express it.

Jim was often persistent in a conversation in trying to get his idea across with his limited language. Example 19 is an exchange initiated by the investigator's question "What's that?" to a picture of some mittens:

(19) Adult: What's that?

Jim: Mittens.

Adult: She's got mittens.

Jim: My mommy my mittens.

Adult: And what's that? (pointing to another picture)

Jim: Off mittens.

Cold.

Adult: Yeah, what's that?(trying to return to picture naming task)

Jim: My cold me.

Within a month of conversational sessions with an adult, there was dramatic improvement in Jim's expressive abilities. He progressed more than

one year in terms of standardized test scores, and some were at age level at the end of this period. By 4, 2 most of the idiosyncratic speech patterns had disappeared, replaced by structures typical for Jim's age. Some examples are given in 20-26:

(20) He's stopping crying.

(21) I want to do it too.

(22) He can't reach them.

(23) I say "bye" to my mommy.

(24) And you ain't got no more?

(25) That's a rabbit right there.

(26) Is it going round?

Over the years that we have followed Jim's progress, though his performance on standardized tests has shown some developmental lag[2], there is no evidence of any problem in his spontaneous speech. His performance in reading and other academic subjects has been normal. His first grade teacher reported that he was a well-adjusted, popular child, and her only complaint was that he tended to "chatter too much." Jim is now in the fifth grade and continues to do well in school.

When Jim was first seen at 3,9 he was using no sign language. We don't know whether he had begun to comprehend any of the signing that he saw taking place between his mother and father at that point. This year his mother reported that he is now becoming a good signer, but that he has only been using a lot of sign language within the last year.

The younger child in the family, who we will call Glenn, was 1 year, 8 months when we started to study Jim. Glenn was observed in 8 sessions at monthly intervals. Further observations and standardized tests were carried out at 3 years, 9 months, 4 years, 10 months, and 7 years, 10

months. Initially, Glenn was in a linguistic environment identical to that in which Jim had developed. At 1 year, 8 months Glenn used no speech, and showed the same absence of loudness in his vocalization that Jim showed in his speech. For example, once Glenn was clearly having a tantrum. His face was red, his fists were clenched and there were tears in his eyes, yet he made only barely audible sounds. This unusual feature of both children's behavior may be due to the fact that a light was used in their room that signalled sound. The vocalizations did not have to be loud to gain their mother's attention.

Although Glenn continued to receive no linguistic input from his mother, two other aspects of his environment changed when we began to study his older brother. He heard speech from adults addressed to him in our observation sessions and during a few visits from a speech therapist. In addition, he heard speech addressed to him from his older brother.

Jim began to acquire English patterns very rapidly and therefore provided a linguistic model for Glenn. In observations of the two children together when Glenn was around 2, we saw examples of Jim teaching lexical items, as in 27 and 28:

(27) Jim: Paper--that's paper.

Glenn: Pape.

Jim: There, paper.

(28) (Glenn picked up a book)

Jim: Book. That's a book.

The older child also frequently interpreted his brother's language and behavior for the observers:

(29) He said "borkter."

(30) Glenn want this one.

(31) He can't reach them.

Glenn never displayed the kind of deviant linguistic structures that Jim used. He started to use some single-word utterances just before he was 2, and by 2 years, 2 months a few routines and combinations had appeared.

Some examples of Glenn's speech at three years, nine months, the age at which we had originally seen his older brother, are given in 32 - 39 :

(32) That's a little boy elephant.

(33) He's going to get me.

(34) I got Christmas tree there.

(35) I wanna play with that.

(36) You can't get on my bus.

(37) I won't break it.

(38) Adult: When is your birthday?
Glenn: I don't have no birthday.

(39) Adult: This little boy's name is Jerry. What is he doing?
Glenn: Making too much noise.

On standardized tests Glenn functioned normally for his age in both expressive and receptive language abilities. Glenn's academic achivements in school have all been at grade level, though he did repeat first grade last year because of frequent crying and other signs of immaturity.

To date, Glenn has showed little interest in sign language. He can fingerspell and he uses some signs but most of his linguistic communication with his mother depends on her lip-reading abilities or his brother's interpretation into sign. When we asked Glenn how he would tell his mother

that he had lost his shoe, he said he would make the sign for shoe. We remarked that the sign alone didn't tell his mother what he was saying about "shoe". Glenn replied that his mother would know what he meant. Probably most of their communication proceeds by using limited linguistic cues in a context that makes the meaning clear. Glenn currently interacts little with his father, who does not read lips.

Interestingly, both children have tended to score relatively low in tests of manual expression on the ITPA, perhaps reflecting the fact that gesturing was discouraged by their mother.

Let us now consider the implications of these two case studies for our understanding of the role of modified input in language development. Obviously, for a child to learn a particular language, there must be some exposure to that language. But what kind of exposure is sufficient for various aspects of language acquisition?

The simpler case is that of the younger child, Glenn. Glenn never experienced extensive one-to-one interaction with a caregiving adult. But by the time Glenn was 2, he had his brother as a conversational partner. Although the conversational interactions were likely very different both quantitatively and qualitatively from that experienced by the typical child, this linquistic environment appeared to be adequate for Glenn to learn English at a normal rate. The subtly tailored input of an attentive mother may facilitate various aspects of the child's linguistic and cognitive development, but much less than an optimal environment may be sufficient for the child to acquire syntactic patterns.

The older child described here, Jim, had been exposed to some English, primarily through television, but had experienced very little speech directed to him personally. In spite of this unusual background, Jim had developed a

linguistic system when we first saw him. His language used English words and some aspects of its structure, but also exhibited consistent patterns not based on English. Jim could construct long sentences that appeared to express concepts that were typical for a child of his age. Thus, it seems that the absence of tailored input did not prevent Jim from developing ways of expressing his ideas. This outcome is consistent with the findings reported by Goldin-Meadow and Feldman (1977) and Feldman, Goldin-Meadow and Gleitman (1977) who studied deaf children of hearing parents. These children invented gestures and even gesture combinations in order to communicate certain basic meanings.

What Jim had not managed to acquire were the syntactic patterns that we use in English. This outcome suggests a different picture of the language learner from that painted during the 60's. At that time, some linguists and psychologists seemed to believe that the child had such powerful innate language acquisition mechanisms that even exposure to a random set of exemplars of the language would result in syntactic development. Certainly Jim met this criterion--he had been exposed to some examples of English sentences-but he failed to learn English syntax. The strong version of the innateness hypothesis might be modified to claim that some minimum number of exemplars are necessary, and that Jim had failed to acquire English syntactic patterns because he had simply not heard enough speech. Perhaps the input from TV is sufficient for a child to learn English, but Jim had not watched enough. However, one aspect of our data argues against this hypothesis. Jim showed dramatic acquisition of the structures of English once he began to interact with an adult on a one-to-one basis. These conversational sessions would have increased the total quantity of his exposure to English utterances only slightly, but they provided many opportunities for him to

begin to "break the code" of the language and discover how English speakers express the meanings he had been using.

In these interactions, what the adult was doing was quite simple, but inherently different from what a TV set can do. She was trying to talk with Jim. That is, she was trying to understand what he meant by what he said and trying to say things in a way that he could understand. When mutual communication is the goal, the setting is optimal for language learning.[3]

Newport, Gleitman and Gleitman (1977) have reported that certain aspects of children's language, such as the expression of the basic semantic relations and the increase in length of utterance, are relatively insensitive to characteristics of mothers' speech style. Certain features of the input, however, appear to facilitate certain aspects of syntactic learning. In the sample studied by Newport, et al. the differences in input characteristics from mother to mother were small, of course, since all of the mothers were using input modified for the child. It is, therefore, quite interesting that we find just the same kind of pattern of relative importance of the input for different aspects of development in a case in which the environment was well outside the norms. Neither the length of Jim's utterances nor the sorts of ideas he communicated changed dramatically when he began to hear English in an interactional setting, but rapid growth occurred in the formal means of conveying meanings in English.

Jim's development points up again that language acquisition involves two processes--having ideas to express and learning the linguistic forms. The particular characteristics of the linguistic interaction experienced by the child may play little role in determining the sort of ideas expressed or even the

complexity of these ideas (at least at early stages of development), but they may influence the ease with which the child learns the formal patterns used to express these ideas. Mere exposure to impersonal sources seems to be insufficient for the child to learn the structure of a particular language in first language acquisition.

We feel that cases of language development in non-typical environments, such as the ones described here, are revealing as to how much and what sort of input is necessary for language learning. They also shed light on the relationship between cognitive development and formal rule learning in language acquisition. We hope that this report will direct other researchers' attention to an interesting population to study in order to increase our information about these important issues.

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FOOTNOTES

1. This research was supported in part by grants from the U. S. Office of Education and the University of Connecticut. Marie L. Johnson collected the data from the first month of observations of Jim. We also wish to recognize the contributions of Alex Gerry, Nancy Garabedian, Mary Anne Mantich, Marciana Robertson and Betty Hancock. We have benefited from comments on these data from Ursula Bellugi, Peyton Todd, and Lee Williams. Our special thanks go to the children's parents, who allowed us to study them and report on their development.

2. Further information based on the standardized test results will be presented in another paper (in preparation).

3. Jean Gleason raised the interesting question of what kind of T.V. programs Jim watched. As she pointed out, if he had watched children's programs, providing exposure to speech that is somewhat simplified for the child viewer, this would strengthen the argument that the interactional characteristics of adult-child input are crucial for development. We expect that exposure to childrens' programs would not be any more conducive to language acquisition than would programs designed for adults, but unfortunately, we have little information about his viewing preferences.